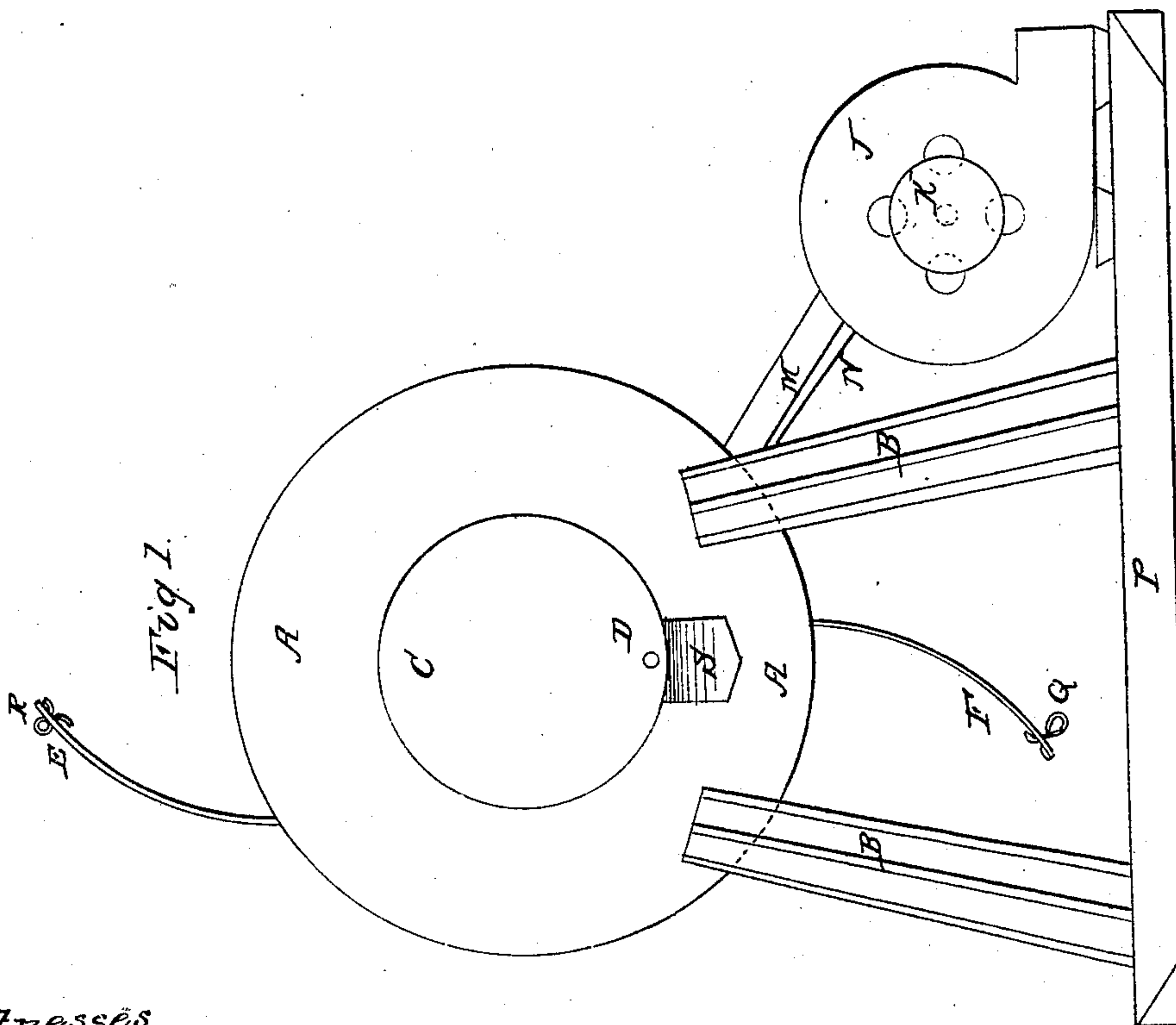
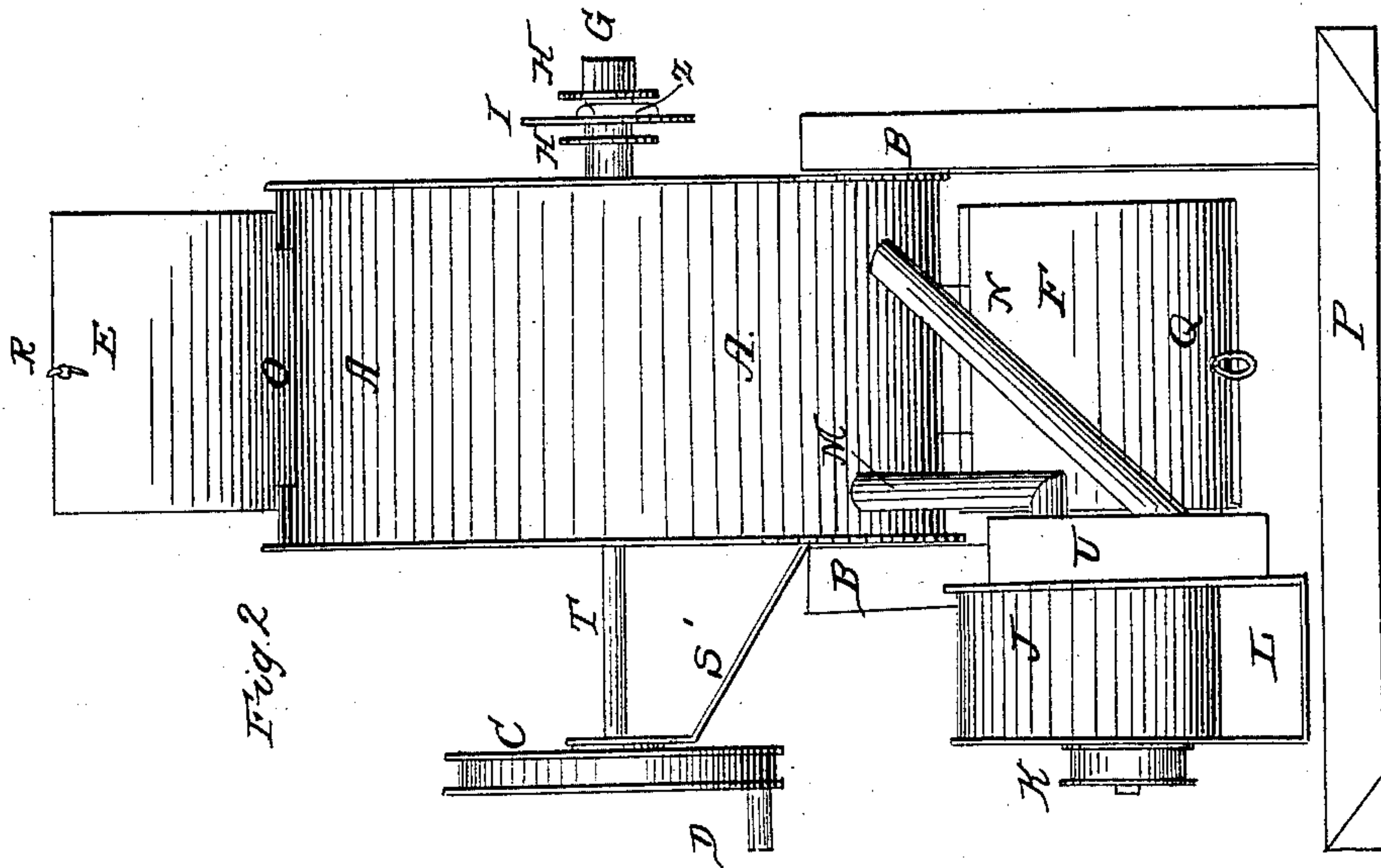


L. P. JENKS.
Cotton Seed Huller.

No. 32,626.

Patented June 25, 1861.



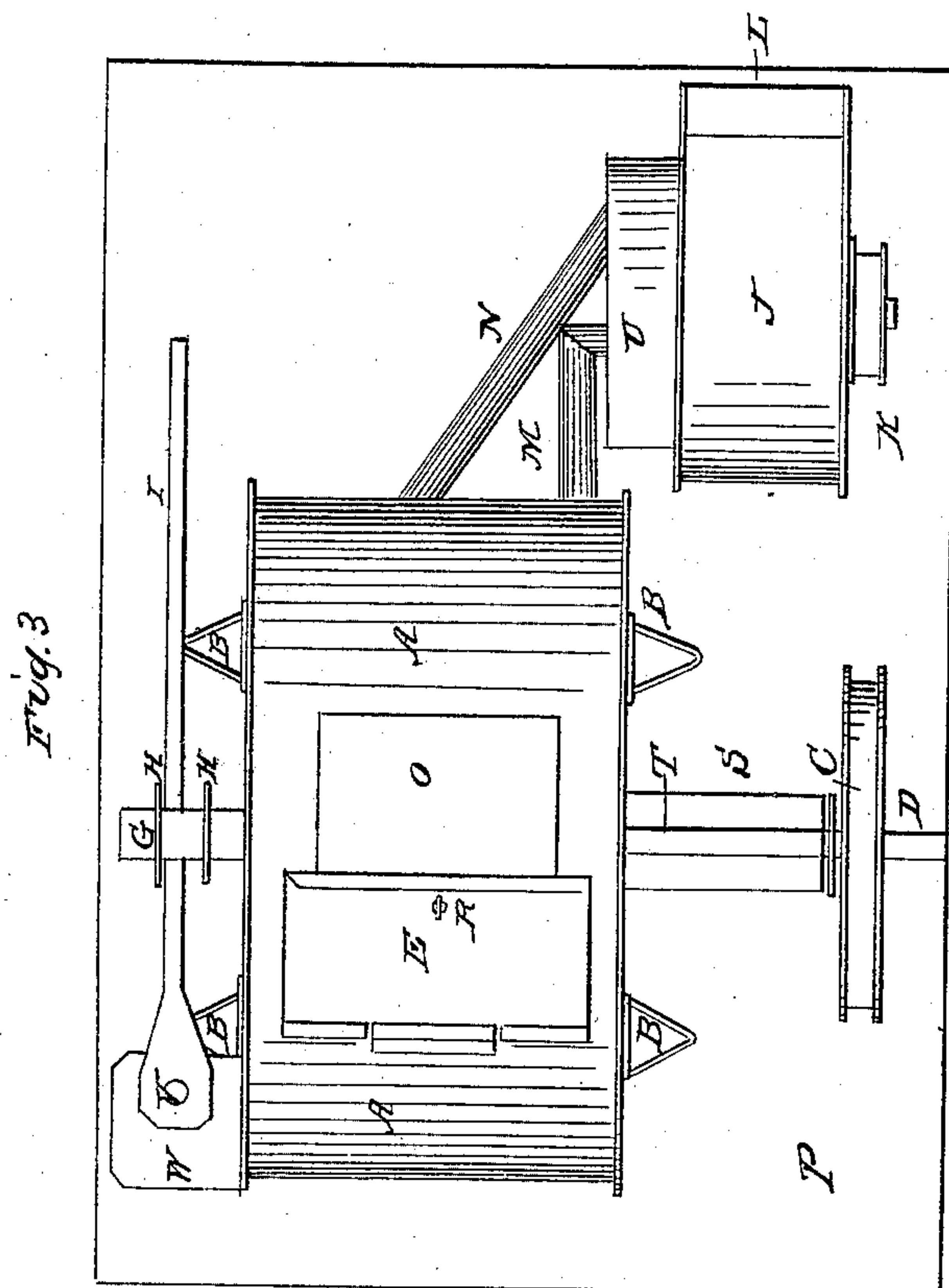
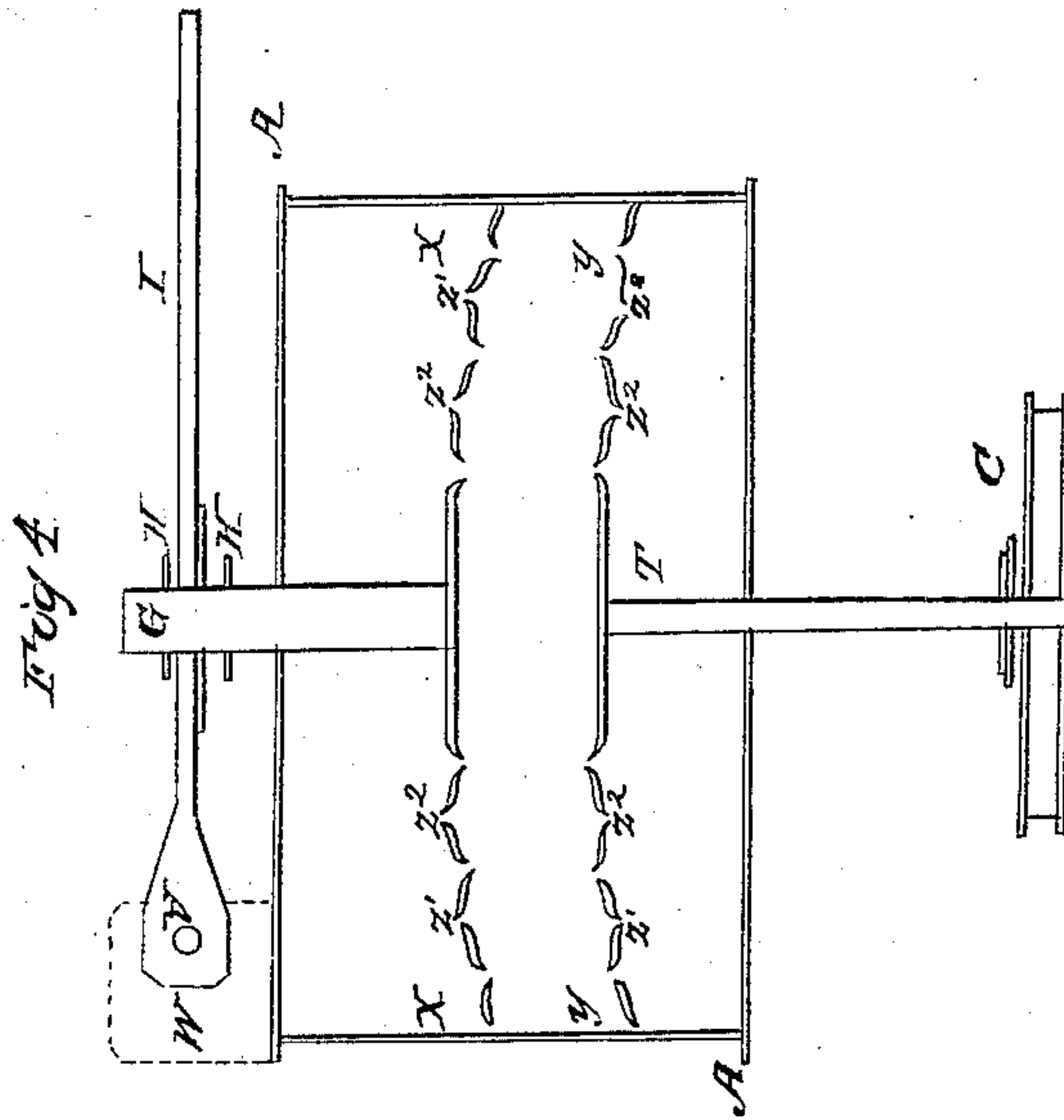
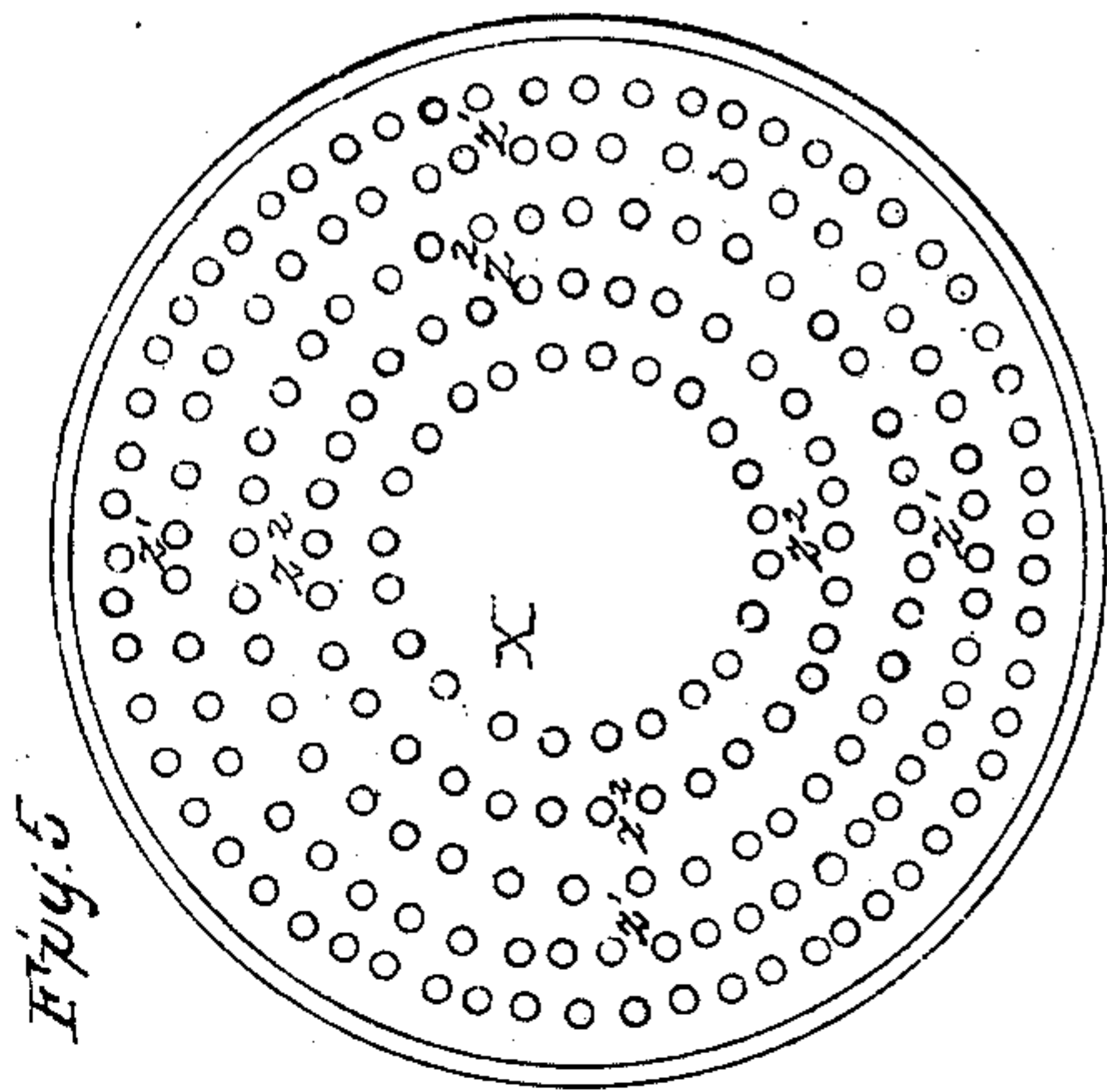
Witnesses
J. Clayton
V. B. Smith

Inventor
L. P. Jenks

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UNITED STATES PATENT OFFICE.

LEMUEL P. JENKS, OF BOSTON, MASSACHUSETTS.

IMPROVED MACHINE FOR DETACHING THE SHORT FIBERS FROM COTTON-SEED.

Specification forming part of Letters Patent No. 32,626, dated June 25, 1861.

To all whom it may concern:

Be it known that I, LEMUEL P. JENKS, of the city of Boston, Suffolk county, State of Massachusetts, have invented a new and useful machine for the purpose of detaching the short fibers from cotton-seed not now detached by the cotton-gin; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention I herewith explain.

In the drawings annexed, Figure 1, Plate 1, represents a side view of the machine; Fig. 2, Plate 1, an end view; Fig. 3, Plate 2, a view from the top; Fig. 4, Plate 2, a horizontal section of the working part of the machine; and Fig. 5, Plate 2, a side or face view of a portion of the inner part, (being a perforated plate,) hereinafter referred to.

In the drawings annexed, A A, Fig. 1, Plate 1, (&c., the same letters representing the same parts in each figure,) is a short cylinder with its axis in a horizontal position, supported by four legs or standards, B B B B, Fig. 1.

C, Fig. 1, is a band-wheel supported by the side of the cylinder and the brace S, and borne upon the shaft T, and bearing a handle, D. In Fig. 4, Plate 2, it will be seen that this shaft is fastened to a perforated plate, Y, similar to one, X, Fig. 4, placed opposite, which plate X is represented in face by Fig. 5, Plate 2. The plate Y is caused to rotate by the motion of the band-wheel C, to which it is attached, and I sometimes make these plates with a plane surface, and sometimes one concave and the other convex; and in the drawings, Plate 2, Fig. 4, the plate X is shown to be concave as regards the chamber between the plates, into which the cotton-seed is placed, and the plate Y is convex, and the perforations do not all point the same way; but while the abrading-perforations in each plate point inward to the chamber between the plates, the alternate rows (marked Z' Z' Z' Z' and Z² Z² Z² Z² in Fig. 5 of Plate 2) point outward from the chamber. The inward perforations are also seen in section view, Fig. 4, Plate 2, and are similarly marked. The plate X is supported by the shaft G, (and sometimes additional by a brace outside of the cylinder,) and does not rotate, but is advanced to or receded

from the plate T by means of the lever I. (Seen at Fig. 4, Plate 2, also at Fig. 3, Plate 2.) This lever is supported by the shaft G, and partly by a pivot, V, fastened to the support W, which (W) is fastened to the side of the cylinder opposite to that which holds the band-wheel. The parts H H, Figs. 3 and 4, Plate 2, are disks fastened firmly to the shaft G, to facilitate the advancement or recession of X by means of the lever I, the friction upon the seeds generating a heat, which is further increased by the pressure between the abrading-surfaces of a roll of the longer of the detached fibers, (which, on account of their length, cannot come through the perforations,) which roll is of course constantly increasing in size, while the space in which it is contained is as constantly diminishing during the working of the machine. It is desirable to moderate this heat. For this purpose I use a device which is also useful in abstracting the detached fibers.

M and N, Figs. 1, 2, and 3, are two tubes or pipes firmly fixed into the lower part of the cylinder A, and entering to the chambers respectively formed by the plates X and Y and their respective ends of the cylinder. Each of these tubes M and N; at their lower end, enter into the chamber U, Figs. 2 and 3, which chamber is fixed to the side of the blowing-cylinder J, (which, differing in nothing from ordinary fan-blasts, need not be more particularly described.) This fan-wheel is actuated by means of the small band-wheel K, Fig. 1, which connects by a twisted band (when in action) with the band-wheel C.

It remains now to describe the operation of the machine. The upper door, E, of the cylinder A A being opened, the lower door, F, Fig. 1, being closed, the cotton-seed is put into the cylinder A A at the upper aperture, O, and between the two plates, filling, say, two-thirds or three-fourths the space. The upper door, E, being then closed and fastened by the fastening R, the band-wheel C is rotated, and during the rotation the plate X is gradually advanced nearer to the plate Y by means of the lever I, as above described. The seeds being rubbed or abraded between the plates, the apertures (seen in Fig. 4 in section and in Fig. 5 in face) allow the passage of the larger portion of the fibers detached, which are then sucked through the pipes M and N by means of the fan-blast J, and discharged at L, Fig. 1,

Plate 1. A portion of the detached fiber remains with the seeds, and is afterward winnowed out. The seeds being finally cleaned, the plate X is then withdrawn by means of the lever I, the rotation of the plate Y is stopped, and the lower door, F, Fig. 1, being opened, the seeds are discharged entirely free from any attached fiber, and are then replaced in the cylinder by a new lot of seed.

It is obvious that my machine may be varied in form at the pleasure of the constructor by using but one abrading-surface, by combining several single machines in one; and by divers other modifications; but the essential particulars of my machine are evidently these: first, the abrasion of the seed to detach the fiber, as contradistinguished from the seizure of the fiber, as practiced with all cotton-gins, or from any chemical means, or from any hulling process.

The rubbing of seeds—such as clover-seed, rice, &c.—is well known and commonly practiced; but the use of this rubbing is clearly indicated by the fact that the parts of the seed sought to be removed are naturally and invariably detached, requiring a crushing or destruction of the hull, and not a planing or abrading of it; and the object of the devices for hulling is the fracture or crushing of the outer covering or hull, which it is desired to remove. The effect of these machines is, in fact, a simple breaking to fragments of a hollow vessel which contains the true seed. The cotton-seed vessel or cotton-boll is different, however, from these. Its "true hull," properly so called, which holds the cotton-fibers as they grow firmly attached to the separate seeds, is detached in the process of gathering, and my machine is not to facilitate this process. The seeds upon which I operate have ever been considered, so far as regards the outer covering of their albuminous and oily portion or kernel, which covering I will for this purpose call the "hull," as entirely analogous to the apple-seed or to the peach-nut. In other words, it has always been thought that the horn-like or woody covering (whichever way one may choose to characterize it) which envelops the kernel was entirely homogeneous, and that the fibers not removable by the cotton-gin could be obtained only by the breaking of the hull. The breakage has been commonly practiced, and is now, to my knowledge, extensively in use. The disadvantage is that the short fibers remain firmly attached, as before, to these fragments of hull, and when the fibers are used for paper the hull containing a deeply-colored dyeing substance, and being of no more capacity of coherence than, say, spent tan-bark, is mixed in the paper, destroying the color and, what is more, the strength of the fiber. It is therefore customary to burn the broken hull with its accompanying fiber.

The short fibers detachable by my machine constitute in weight about eleven per cent. of the seed as it comes from the plantation, and this seed, with its short fibers not taken off by

the gin, weighs about twenty-eight pounds to the bushel. There are about four pounds of seed collected to each pound of ginned cotton. From these data, taking the annual production of cotton in the United States, it will be seen that something over six hundred million pounds of cotton-fiber fit for the manufacture of paper are annually wasted in the United States, owing to the circumstance that the hull of the cotton-seed has been supposed to be analogous to the hull of the apple-seed, and probably, also, to the imitation by experimenters and inventors of the action of the cotton-gin, which readily removes the long fiber, but cannot seize the short fibers; but my microscopic and chemical examinations have discovered to me the important fact that there is a peculiarity in the structure of the cotton-seed hull which I believe has no analogue in botany. The testa or hull, instead of being homogeneous, is composed of five layers, the part next to the seed being a layer of substance resembling oak-bark both in its mechanical and chemical structure, and four layers beyond this, the first three of a corneous or horny appearance under the microscope, making in section three bands of light brown, yellowish, and dark brown, and, fifth, a dark-brown layer thinner than either of the others, but firmly attached to and forming a part of them, of a substance resembling oak-bark, and which, for want of any appropriate botanical name, may with propriety be called the "supertesta." In this layer the cotton-fibers are rooted. This layer is no wise analogous to the hull of wheat, rice, or clover.

To find with cotton-seed an analogue to the hull of wheat, rice, or clover, we must include the whole five layers, they constituting the hull, the removal of which can readily be effected by hulling-machines, which machines are constructed and operated for an entirely different purpose. They will free the only kernel, and so far be valuable, but will waste and render useless the hundreds of millions of pounds of fiber which might be annually utilized by my machine. This layer or supertesta appears to contain neither silicex nor cellulose. It does not protect to any useful extent the albuminous portion from atmospheric influences or insect attacks, as is the recognized function of the hulls of seeds. It is a thing *sui generis*. Its sole function appears to be to attach the fibers to the testa or hull, and its removal is no wise analogous to the process called "hulling." The removal of this supertesta is in effect not the breaking of the hull, as with hulling machinery, but the planing off of the outer surface of the hull—a process which has never before been practiced with any seed, because, so far as my investigations have gone, this supertesta does not exist with any other seed; next, the perforation of the rough abrading-surface to allow of the automatic removal of the detached fiber in part; next, the assistance to the removal of the same without the necessity of stopping

the action of the machine; and, next, the modifying the working of the machine, so that its action—which, if commenced with the mass of seed and attached fiber occupying the same space as is required by the seed near the end of the operation, with but a small quantity of the fiber which was originally attached, would cause a strain upon the machine, a heating of the same, a breaking of the hull, &c.—is graduated according to the work it has at the instant to perform. These are the essential features of my machine, and I thus express my claims.

I claim—

1. Detaching the short fibers not now re-

moved by the cotton-gin from cotton-seed by means of a machine constructed and used substantially as described and set forth.

2. The use of a perforated plate, as above described, with substantially its alternate row of perforations pointing inward and outward, thus not only effecting the abrasion with the inward-pointing perforations, but by means of the outward-pointing perforations assisting the cooling of the machine and abstraction of the fiber by means of a fan-blast.

LEML. P. JENKS.

Attest:

JOHN S. HOLLINGSHEAD,
PAUL STEVENS.